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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER				
KELLEY, STEVEN SHAUN				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/583,792

Applicant(s)

LEE ET AL.

Examiner

STEVEN KELLEY

Art Unit

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4-28-06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/55/08)
Paper No(s)/Mail Date 6-21-06
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 7,461,164 to Edwards et al. (hereinafter "Edwards") in view of the IEEE article from September 2000 entitled "IP QoS Delivery in a Broadband Wireless Local Loop: MAC Protocol Definition and Performance Evaluation" by Baiocchi et al. (hereinafter "the MAC Protocol article").

Regarding claim 1, Edwards teaches an OFDMA-TDMA (Orthogonal Frequency Division Multiplex--Time Division Multiple Access) based wireless Internet terminal comprising: a QoS profile storing information about a QoS policy (see QoS module 58 as shown in Fig. 7 and described in columns 10-11, which "stores QoS policies", as recited); a classifier for classifying data packets to be transmitted according to the QoS policy (see QoS module 58, which "classifies", as recited); a first module including a first priority controller that gives priorities to the classified data packets according to the QoS policy (see software-based MAC component 24A and see column 9, lines 32-35, which teach that the "software-based MAC component 24A also has a number of virtual

queues to assist QoS functions"); a second priority controller for determining priorities of the PDUs according to a predetermined policy (see hardware-based MAC component 24B, as shown in Fig. 6 which includes transmit logic 34 and transmit queues 36 and 38, where higher priority may be given to one of the queues (as taught in column 9, lines 17-20, where the "predetermined policy" may be time-critical packets as described in column 2, lines 35-41, policies included in command structures from the software-based MAC component 24A (such as shown in Figs. 9-10) or the "prioritization scheme" taught in column 11, lines 1-3); and a second module arranging the PDUs in an allocated bandwidth to transmit the PDUs (see hardware-based MAC component 24B, as shown in Fig. 6 which transmits packets in allocated bandwidth, as recited).

Although Edwards teaches generating "packets" (which could be considered as a "protocol data unit" or PDU), Edwards does not explicitly teach a "PDU maker for generating PDUs from the data packets given the priorities" as recited, and also does not explicitly teach a "OFDMA-TDMA (Orthogonal Frequency Division Multiplex--Time Division Multiple Access) based wireless Internet terminal", as recited.

The MAC protocol article (which is for an "OFDMA-TDMA (Orthogonal Frequency Division Multiplex--Time Division Multiple Access) based wireless Internet terminal", as recited) teaches methods of scheduling packets for transmission. As shown in Fig. 3 of the MAC protocol article, packet traffic related functions include "classifying" the packets into "guaranteed bandwidth" or "best effort" queues and providing the packets from these queues to a MAC scheduler which uses a MAC fair scheduling algorithm. As described in sections B and C on page 1612 of the MAC protocol article (and shown in

Fig. 6 on page 1613), the MAC signaling section and MAC fair scheduling algorithm sections teach the use of MAC PDUs for scheduling and transmission purposes, where the MAC scheduler “generates PDUs from the packets given priorities”, as recited.

Therefore, as both Edwards and the MAC protocol article teach packet QoS features implemented in the MAC layer, it would have been obvious to one of ordinary skill in the art to modify Edwards with the ability to generate PDUs from the prioritized data packets (as taught by the MAC protocol article), in order to properly schedule packets for transmission, as is conventional.

Regarding claim 2, which recites “wherein the first module further includes an admission controller that determines admission or discard of the data packets classified by the classifier”, any packet which is stored in the queues after being classified (in either Edwards or the MAC article) must have had its “admission determined”, as recited. Therefore, as the software-based MAC component 24A inherently performs this function (of admission), it would have been obvious to include an “admission controller” in the software-based MAC component 24A. See also section C on page 1612 of the MAC protocol article, the fair scheduling algorithm “gives GB priority over BE packets”, which for scheduling purposes based on available bandwidth results in dropping (or recited “determining discard”) of classified packets.

Regarding claim 3, which recites “wherein the first module further includes a QoS queue storing the data packets classified by the classifier, and a priority queue storing data packets admitted by the admission control based on their priorities”, see column 9,

lines 32-35, of Edwards, which teaches that the "software-based MAC component 24A also has a number of virtual queues to assist QoS functions". Regarding the recited "priority queue", see transmit queues 36 and 38 (as shown in Figs. 6 and 8), which store packets based on priority, as recited.

Regarding claim 4, which recites "wherein the first module is constructed in a MAC layer by software", see MAC S/W component 24A in Edwards, which is constructed, as recited.

Regarding claim 5, which recites "wherein the second module includes a sorting queue sequentially storing the PDUs based on priorities assigned by the second priority controller", see transmit queues 36 and 38 (as shown in Figs. 6 and 8), which store packets based on priority, as recited.

Regarding claim 6, which recites "wherein the PDUs are MAC PDUs, and the second priority controller gives priorities to the MAC PDUS in the order of an ACK packet, a management message packet and a user data packet independently from the QoS profile", see column 9, lines 20-23, which teach that packets from "queues 36 and 38 can be used to separate packets that should be transmitted in an announcement traffic indication message (ATIM) period from those that should not", which is a "management message packet", as recited. See also column 16, lines 16-24 which teaches that "MAC H/W component 24B is used to find time to transmit ACK packets". Therefore, as Edwards also teaches that the second prioritizing of packets (from queues 36 and 38) can also be based on other factors such as time-sensitive packets and ACK packets, it would have been obvious to one of ordinary skill in the art to prioritize the

packets (or MAC PDUs as modified by the MAC protocol article) in the recited order, as time sensitive packets should be prioritized over user data packets, as is conventional.

Regarding claim 7, which recites "wherein the second module is constructed in a MAC layer by hardware", see MAC H/W component 24B in Edwards, which is constructed, as recited.

Regarding claim 8, Edwards teaches a packet processing method in a wireless Internet terminal, comprising: classifying and storing data packets based on a QoS policy (see column 9, lines 32-35, which teach that the "software-based MAC component 24A also has a number of virtual queues to assist QoS functions"); providing first priorities to the data packets classified based on the QoS policy (the "first priorities" are the QoS priorities); storing the data packets given the first priorities in a queue and sequentially outputting the data packets based on their priorities (packets stored in higher QoS virtual queues would be sequentially output, as recited); providing second priorities to the data packets based on characteristics of the data packets independently of the QoS policy (see hardware-based MAC component 24B, as shown in Fig. 6 which includes transmit logic 34 and transmit queues 36 and 38, where higher priority may be given to one of the queues (as taught in column 9, lines 17-20), where the second priorities may be time-critical packets as described in column 2, lines 35-41, or policies included in command structures from the software-based MAC component 24A (such as shown in Figs. 9-10) or the "prioritization scheme" taught in column 11, lines 1-3); and sequentially sorting the data packets based on the second priorities to arrange the

data packets in an allocated bandwidth (see hardware-based MAC component 24B, as shown in Fig. 6 which arranges packets in allocated bandwidth, as recited).

Although Edwards teaches QoS priorities, the MAC protocol article is added for completeness.

As shown in Fig. 3 of the MAC protocol article, packet traffic related functions include "classifying" the packets into "guaranteed bandwidth" or "best effort" queues, which are "QoS policies and priorities", as recited. Additionally, the MAC protocol article teaches providing the packets from these queues to a MAC scheduler which uses a MAC fair scheduling algorithm and as described in section C on page 1612 of the MAC protocol article, the fair scheduling algorithm "gives GB priority over BE packets", which for scheduling purposes based on available bandwidth results in dropping of classified packets.

Therefore, as both Edwards and the MAC protocol article teach packet QoS features implemented in the MAC layer, it would have been obvious to one of ordinary skill in the art to modify Edwards with the ability to classify and store packets based on QoS policies and priorities (as taught by the MAC protocol article), in order to provide for the most comprehensive scheduling and transmission of packets based on QoS factors as is conventional.

Regarding claim 9, which recites "further comprising determining admission or discard of the classified data packets", any packet which is stored in a queue after being classified (in either Edwards or the MAC article) must have had its "admission

determined”, as recited. See also section C on page 1612 of the MAC protocol article, the fair scheduling algorithm “gives GB priority over BE packets”, which for scheduling purposes based on available bandwidth results in dropping (or recited “determining discard”) of classified packets.

Regarding claim 10, which recites “wherein the classifying and storing data packets, determining admission or discard of the classified data packets and giving first priorities to the classified data packets are executed by software, and the giving second priorities to the data packets and the arranging the data packets are executed by hardware”, as described above, the MAC S/W component 24A and MAC H/W component 24B in Edwards, perform the recited functions.

Regarding claim 11, Edwards teaches a recording medium storing a program used for a wireless terminal that gives first priorities to data packets based on a QoS policy, gives second priorities to the data packets based on packet information of the data packets given the first priorities and uplink-transmits the data packets, the recording medium comprising (see column 3, lines 58-67, which teach storing instructions on a computer readable medium, as recited): storing the QoS policy as a QoS profile (see QoS module 58 as shown in Fig. 7 and described in columns 10-11, which “stores QoS policies as a profile”, as recited); classifying and storing the data packets based on the QoS policy (see column 9, lines 32-35, which teach that the “software-based MAC component 24A also has a number of virtual queues to assist QoS functions”); determining admission or discard of the classified data packets (inherently any packet

stored in the queues must have had it's "admission determined", as recited); and providing the first priorities to data packets allowed to be admitted according to the QoS policy (see hardware-based MAC component 24B which processes the packets received from the software-based MAC component 24A, with QoS commands from the software-based MAC component 24A (see also Figs. 6 and 11)).

Although the recited features such as "classifying" and "determining admission or discard of the classified data packets" must inherently be present in Edwards (although not explicitly mentioned), the MAC protocol article is added for completeness.

As shown in Fig. 3 of the MAC protocol article, packet traffic related functions include "classifying" the packets into "guaranteed bandwidth" or "best effort" queues and providing the packets from these queues to a MAC scheduler which uses a MAC fair scheduling algorithm. As described in section C on page 1612 of the MAC protocol article, the fair scheduling algorithm "gives GB priority over BE packets", which for scheduling purposes based on available bandwidth results in dropping (or recited "determining discard") of classified packets. Therefore, the MAC protocol article explicitly teaches "classifying packets" (as shown by storing packets into GB or BE queues) and "determining admission or discard of the classified data packets" using a MAC scheduler employing a fair scheduling algorithm.

Therefore, as both Edwards and the MAC protocol article teach packet QoS features implemented in the MAC layer, it would have been obvious to one of ordinary skill in the art to modify Edwards with the ability to classify and determining admission or discard of the classified data packets (as taught by the MAC protocol article), in order to

provide for the most comprehensive scheduling and transmission of packets based on both QoS factors and scheduling factors, as taught in the Summary of the Invention section in Edwards.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEVEN KELLEY whose telephone number is (571) 272-5652. The examiner can normally be reached on Monday-Friday, 9AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SSK/

/Lester Kincaid/
Supervisory Patent Examiner, Art Unit 2617